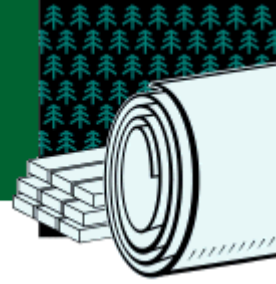


FOREST PRODUCTS

Project Fact Sheet



ACOUSTIC SEPARATION TECHNOLOGY: PHASE II

BENEFITS

- Reduces investment and operating costs
- Minimizes energy consumption
- Reduces environmental impact per unit of pulp or paper production
- Offers technique for potential separation of vessels or shives from fibers, and of various fiber species (e.g., softwood from hardwood)
- Saves energy and water
- Increases use of raw materials
- Improves product quality
- Offers excellent controllability compared to pressure-screen systems

APPLICATIONS

Fiber fractionation, separation, pulp thickening, dewatering of waste products, and removal of undesirable particles in closed water systems have all been identified as potential applications for this technology.



Promising Results from Earlier Research Efforts Prompt Pilot Scale Experimentation of Acoustic Separation Technology

In 1992, the Institute of Paper Science and Technology found that when water suspended fibers interact with acoustic radiation pressure (ARP), they are propelled into motion. Hoping to understand the fundamental effects of ARP on suspended fibers, researchers conducted a two year study sponsored by the Department of Energy. Results showed that differential migration, based on fiber width, is the principle used to separate the different fibers in suspension. The data yielded information on ARP's effect on pulp compaction, fiber deflection and separation efficiency.

The original project was granted a year extension, giving researchers a chance to upgrade its previous 15 gpm acoustic separator to a 100 gpm pilot scale acoustic separator system. This second phase of acoustic separation technology investigation will provide a mill demonstration of the capability of acoustic separation of pulp fibers (whitewater clarification), and conduct a technical/economic feasibility study. A 100-gpm pilot-scale acoustic separation system has been built and will be tested at a SP Newsprint Co. mill during the fall of 2000.



Figure 1. Acoustic transducer located in the whitewater stream

PROJECT DESCRIPTION

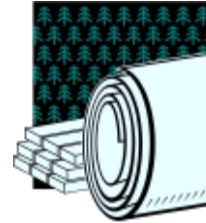
Goal: To design, construct, evaluate, and perform mill demonstration of an updated acoustic separation system.

This 1 year extension of a previous research proposal will build on previous laboratory data and computational analyses on the effects of acoustic separation on suspended fibers. The 100 gpm pilot-scale acoustic separation system will be tested at a SP Newsprint mill. The trial will use an off-line flow loop that is supplied through the paper machine white water system. The flow loop includes a supply tank, a clean stream collection tank, a concentrated fiber stream collection tank, provision for adding flocculant to the stream prior to reaching the acoustic section, and instrumentation for pressure, flow, and consistency measurements. Two acoustic transducer designs will be evaluated.

PROGRESS & MILESTONES

The following milestones have been identified for reaching the objectives of this research:

- A research program was initiated in 1992 at IPST to study the fundamentals of acoustic radiation pressure (ARP).
- Experimentation discovered that one could exploit the migration effect to compact a wet fiber mat and separate fibers based on fiber width.
- An 15 gpm separation system was developed and later patented in Phase I of the project that allowed better control of several variables.
- A water tank and 3D mapping system were built to investigate the fundamentals of ARP propagation in water and to measure the uniformity of the sound field produced by various prospective transducer designs.
- A semi-empirical model was proposed to predict separation efficiency.
- A preliminary economic analysis was prepared.
- The host mill for demonstrations was identified as SP Newsprint Co.
- SP Newsprint and IPST have agreed to a testing schedule and tentative experimental plan.
- All three sections of the pilot clarifier are complete and have been installed at the host mill, testing will begin in late October 2000.
- All instrumentation for pilot clarifier trial has been delivered to SP Newsprint.
- The first of the two transducers for the pilot trial has been delivered and is undergoing checkout.
- Since March 2000 a paper on Acoustic Separation Technology has been accepted for publication in the JPPS and a patent on the technology has been submitted.
- Researchers are in the process of identifying potential commercialization partner(s).



PROJECT PARTNERS

Institute of Paper Science and Technology
Atlanta, GA

SE Newsprint Company
Dublin, GA

Sonic Concepts
Woodenville, WA

Material Systems, Inc.
Littleton, MA

FOR ADDITIONAL INFORMATION PLEASE CONTACT:

Valri Robinson
Office of Industrial Technologies
Phone: (202) 586-0937
Fax: (202) 586-3237
e-mail: valri.robinson@ee.doe.gov

Dr. Fred Ahrens
Institute of Paper Science and Technology
500 10th St., N.W.
Atlanta, GA 30318
Phone: (404) 894-6496
e-mail: fred.ahrens@ipst.edu

Dr. Tim Patterson
Institute of Paper Science and Technology
500 10th St., N.W.
Atlanta, GA 30318
Phone: (404) 894-4797
e-mail: tim.patterson@ipst.edu

Please send any comments,
questions, or suggestions to
webmaster.oit@ee.doe.gov



Office of Industrial Technologies
Energy Efficiency and Renewable Energy
U.S. Department of Energy
Washington, D.C. 20585

October 2000